Form IIIB
1977-78

Year 7

Parents' National Educational Union
Murray House, Vandon Street, Buckingham Gate, London SW1H 0AJ

THE PNEU SCHOOL

EDUCATIONAL PROGRAMME 87

This Programme is designed for use only with pupils in PNEU Schools and in the Home Education Division. It must not be lent or used for any other purpose.

"Children are born persons" – Charlotte Mason
PNEU Motto: "I am, I can, I ought, I will"

GENERAL NOTES

CONTENTS

This Programme sets out the syllabuses and book lists for the year. The Teacher's Handbook is complementary to it and should be studied before the Programme is put into use.

Essential books are printed in capitals. Other books are optional but would be valuable for supplementary or reference purposes.

The Programme for each form is planned to cover one year's work, divided into 3 terms of 12 weeks each. As enrolments occur throughout the year, new members will normally begin with Term 1 and complete an assessment report on Form R5 before beginning Term 2.

SUPPLIES

Books

An adequate range of books is essential for the PNEU course. The initial books required will be supplied by PNEU tutors and despatched to members overseas by surface mail or, if requested, by air mail. The appropriate postal

and handling charges will be debited. Members going abroad are advised that books should be obtained before departure if possible.

Subsequent requirements of books may be ordered from the PNEU by post on Form R7. 25% of the cost of the books should be added to the payment for postage and handling if sent by surface mail, and 75% if required to be sent by air mail.

Members may find that some books are unobtainable and alternatives will be sent in their stead.

The price given in the Programme is that in force at the time of going to press.

Materials

A list of the educational materials required is set out in Appendix 1.They may be obtained from any firm of educational suppliers. Harrods (Export Department) would be able to supply most of the requirements.

Families going overseas are recommended to obtain these materials before departure.

THE TEACHER'S HANDBOOK

This is a condensed guide to the theory and practice of home teaching which should be used in conjunction with this Programme. It contains advice on how to understand the growing child as well as on how to teach him. Each subject is dealt with in a separate section. It has been kept brief so that even the busy parent can study it.

ASSISTANCE IN TEACHING

The circumstances under which home teaching takes place vary enormously. Parents are advised to seek assistance from friends and colleagues wherever it is appropriate. Not only is a subject or a hobby taught by another person a welcome change but real ability can in this way be harnessed, whether it be mathematical, technical or musical.

THE CURRICULUM

The PNEU course deliberately covers a broad range of subjects. Our aim is to produce soundly educated children who will develop into mature, cultured adults. The PNEU child is marked by a high standard of literacy, mathematical competence, a wide field of knowledge and an enquiring mind.

In year 7 a pupil cannot be expected to study the textbooks for himself.

In a school this would not be expected of him except for short periods of private study. The parent must act as a teacher and be ready to spend considerable time on such matters as preparing lessons, answering questions or helping the pupil to find the answer and correcting work the pupil has done.

If at all possible, specialist help should be obtained for Mathematics and and Science. There is little to be gained from embarking on Science if suitable facilities are not available.

THE PNEU JOURNAL

The PNEU Journal is issued quarterly and contains articles of general educational interest as well as information on PNEU.

RECORDS

In the United Kingdom, local education authorities are required to satisfy themselves that the education of all the children in their area is adequate. Parents responsible for home -school pupils must keep a Record of Work and an Attendance Register as they may receive visits from LEA Inspectors or Education Welfare Officers. In some other countries similar conditions may be encountered.

SYLLABUS

RELIGIOUS KNOWLEDGE

Use any edition of the BIBLE. The New English Bible and other modern translations are particularly appropriate.

THE ONE VOLUME BIBLE COMMENTARY by William Neil (Hodder, 95p) is recommended, especially for help with work done on the Old Testament.

Modern translations of the Bible: The New English Bible – illustrated edition (British and Foreign Bible Society, £1.00). The Jerusalem Bible – School Edition (Darton, Longman & Todd, £2.00).

Old Testament

Term 1: Genesis chapters 1-23

Term 2: Genesis chapters 24-47

Term 3: Genesis chapters 48-50

Exodus chapters 1-15

TIME-TABLE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9.00 – 9.40	Old Testament	New Testament	Latin or English Language	History	English Language
9.40 – 10.20	English Language	English Language	History	English Language	Geography
10.20 – 11.00	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics
11.00 – 11.20	BREAK				
11.20 – 12.00	Science	Geography	French or Leisure Reading	French or Private Study	Latin or Leisure Reading
12.00 – 12.40	Science	Literature	Geography	Literature	Literature
12.40 – 13.20	French or Science	History	Old Testament	New Testament	History
14.00 – 14.40	Music	Picture Study	Music	Games	P.E.
14.40 – 15.20	Art & Design	P.E.	Nature Study	Science	Private Study
15.20 – 16.00	Art & Design	P.E.	Private Study	Science	Private Study

New Testament

Term 1: St. Matthew chapters 1-10

Term 2: St. Matthew chapters 11-20

Term 3: St. Matthew chapters 21-28

ENGLISH

Language

THE ART OF ENGLISH (CERTIFICATE SERIES) BOOK 1 by K. Newson (Schofield & Sims, £1.59)

or THE ART OF ENGLISH (GENERAL SERIES) BOOK 1 by R. Mansfield (Schofield & Sims, £1.59)

The Art of English series comprises two complete but closely integrated courses which are designed in such a way that a transfer from one course to the other is possible if this is felt to be in the pupil's interest.

The Certificate Course (C) is suitable for the pupil with imagination and an interest in literature. Throughout the books there are suggestions for further reading and research to develop language skills.

The General Course (G) is very similar but is meant for the pupil who prefers a practical rather than a literary approach to English.

About six chapters a term should be worked through, whichever book is chosen. There is no need to feel that all the exercises ought to be attempted. Some will be obviously unsuited to those in the home schoolroom and some may be too long for the time available. A selection can be made of those considered most interesting.

For reference: The Concise Oxford Dictionary (Oxford, £4.75). For spelling practice where this is considered necessary: Essentials in Teaching and Testing Spelling by F. J. Schonell (Macmillan, 59p).

Literature

Set Fiction

Choose at least two books each term.

Term 1: HUCKLEBERRY FINN by Mark Twain (Puffin, 50p)
A WIZARD OF EARTHSEA by Ursula Le Guin (Puffin, 50p)
THE YEARLING by Marjorie Kinnan Rawlings (Piccolo, 70p)

Term 2: KNIGHT'S FEE by Rosemary Sutcliff (Oxford, 35p)
TREASURE ISLAND by Robert Louis Stevenson (Puffin, 50p)
POLLYANNA by Eleanor H. Porter (Puffin, 50p)

Term 3: THE IRON LILY by Barbara Willard (Puffin, 50p)
THE GREAT BRAIN by John D. Fitzgerald (Dent, 50p)
DRAGONSLAYER by Rosemary Sutcliff (Puffin, 35p)

Poetry

THE SHELDON BOOK OF VERSE 3 (Oxford, £1.47)
This Way Delight edited by Herbert Read (Faber, 75p)

Shakespeare plays — for Schools only
Term 1: Richard II
Term 2: The Taming of the Shrew
Term 3: The Winter's Tale

Leisure Reading

The Circus is Coming by Noel Streatfeild (Puffin, 60p)
The Island of Horses by Eilís Dillon (Puffin, 50p)
Hobberdy Dick by K. M. Briggs (Puffin, 50p)
The Ghost in the Noonday Sun by Sid Fleischman (Puffin, 35p)
Rewards and Fairies by Rudyard Kipling (Piccolo, 50p)
Break for Freedom by Ewan Clarkson (Puffin, 50p)

MATHEMATICS

NEW GENERAL MATHEMATICS, BOOK 1 by Channon, McLeish Smith & Head (with answers) (Longman, £1.30)

Term 1: chapters 1-9
Term 2: chapters 10-18
Term 3: chapters 19-27

Read the explanations and go through the worked examples in the chapters before doing the exercises even if you think you are familiar with the topic covered.

The following notes point out the common errors and difficulties which can arise.

Chapter 1. The LCM is important because of its later use in fractions. A common mistake in the use of the index notation is to say $2^3 = 2 \times 3$ and not $2 \times 2 \times 2$.

Chapter 2. The results 10mm = 1cm, 100cm = 1m, 1000m = 1km. and 1000gm = 1kg should be learned but it is not necessary to memorise the other results.

Chapter 3. Note: (1) If there is no symbol between the letters ab then the x sign is implied. ab = a x b (2) The difference between the meaning of $6x$ and x^6 (3) The same letters but with different powers such as x^3, x^2 and x^7 are unlike terms and cannot be combined together by addition or subtraction.

Chapter 4. Remember you must have a starting point for directed numbers — the ground for ladders, 0° for temperature, 0 for simple numbers.

Chapter 5. When you are finding the common denominator of two fractions use the lowest number possible.

Example: $\frac{4}{9} + \frac{5}{6} = \frac{8 + 15}{18} = \frac{23}{18} = 1\frac{5}{18}$

Whereas: $\frac{4}{9} + \frac{5}{6} = \frac{24 + 45}{54} = \frac{69}{54} = 1\frac{15}{54} = 1\frac{5}{18}$

though not wrong, gives extra work because of the large numbers involved and the cancelling.

Chapter 6. Have a sharp pencil for construction work. All arcs must be clearly shown and must cut distinctly in **one** point.

Chapter 7. It is worth doing a rough check for decimal work — it will help you to decide where the decimal point in answer should go by common sense.

Chapter 8. This is an important chapter as it forms the basis of algebra. Do not take short cuts with the solution of equations, but keep to the given methods, till you are quite sure of yourself.

Chapter 9. No special points to be noted.

Chapter 10. Practice drawing angles with a protractor in all directions, not just horizontally. Make sure you are measuring from 0° as a starting point and not from the 180° mark.

Chapter 11. When there is a bracket to be removed, remember to multiply every term inside the bracket by the factor outside:

$2(3a + 5b) = 6a + 10b$ NOT $6a + 5b$

If there is no number outside other than —, the number — 1 is implied:

$-(3a + 5b) = -1(3a + 5b) = -3a - 5b$

Reversing the process, if you take out a factor, take it out of both parts of the expression.
Example: $3a - 6b = 3(a - 2b)$ NOT $3(a - 6b)$

Chapter 12. Whatever base you are using, the number of digits in your system must be the same as your number base.
Example: Base 4 can use 0, 1, 2, 3 and no others.

Chapter 13. Note the points made on Page 130. It is worth making a rough sketch first. It tells you how to place the accurate diagram on your page and avoids the frustration of finding that part of your diagram will go off the page, making you start again.
Angles of depression are always measured from the horizontal and not the vertical line.

Chapter 14. The line in a fraction acts as a bracket and so the denominator acts as a factor.
Example: $\frac{8a + 12}{4} = \frac{1}{4}(8a + 12) = 2a + 3$

Avoid $^{2}\not{8}\frac{a + 12}{\not{4}} = 2a + 12$ which is wrong.

Watch for — outside the 'bracket'

$\frac{-8a - 12}{4} = -\frac{1}{4}(8a - 12) = -2a + 3$ NOT $-2a - 3$

Chapter 15. Look carefully at the table of units on Page 163. You do not have to know them by heart, but you must know how to derive them.
When dealing with circles notice particularly if the question gives you the radius or the diameter.

Chapter 16. A power only applies to the number to which it is attached.
Example: $d = 4{\cdot}9t^2$ means $d = 4{\cdot}9 \times t \times t$ and not $4{\cdot}9 \times 4{\cdot}9 \times t \times t$.

Chapter 17. If a problem stipulates "calculate the angle", then you must do so, and not find it by measuring your diagram however accurately you do so.

Chapter 18. No special points to be noted.

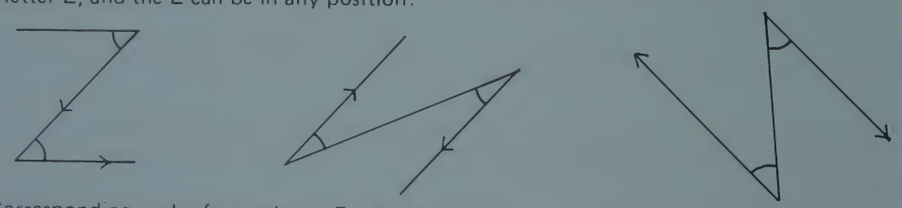
Chapter 19. You will find that if you write a sentence to say what is given in the question, with the quantity you want to find at the END of the sentence, the problem will solve itself.
Example: A book of 480 pages is 2·4cm. thick. How many pages are there in a book 1·9 cm. thick?
Answer "Pages" is what we want to find out so write:

2·4cm. contain 480 pages
1 cm contain $\frac{480}{2{\cdot}4}$ pages
1·9cm. contains $\frac{480}{2{\cdot}4} \times 1{\cdot}9$ pages

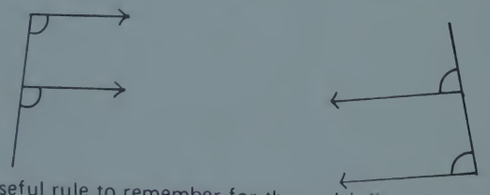
If you write: 480 pages is 2·4cm. **thick** you will not be able to proceed.
Look critically at your answer to make sure it is a sensible one.

Chapter 20. In cost and selling price problems, it is the COST price that is always taken as 100%. The profit is found as a percentage of the cost price.

Chapter 21. You will find it easy to spot alternate angles if you remember that they make a letter Z, and the Z can be in any position:



Corresponding angles form a letter F. The letter F can be in any position.



Chapter 22. A useful rule to remember for the multiplication and division of two directed numbers is that if the signs are the same the result is +; if the signs are different the result is−;

(+) × (+) or (−) × (−) gives (+)
(+) × (−) or (−) × (+) gives (−)

Chapter 23. If a question says "Four students do maths and French . . ." (page 237) this does NOT mean that the students do French and maths only, but it means that they may or may not do other subjects as well as the subjects French and maths.

Chapter 24. Make sure you understand the difference between solving an equation and simplifying an expression. 'Solve' means you have to find an actual number for the unknown letter in the quotation.
'Simplifying' means combine together any terms that you can, so that the expression looks simpler than it did at the start.

Chapter 25. Notice particularly the instructions on Page 250 on how to draw a graph. The purpose of the graph is to present to the reader the information in a clear way, with no possibility of misunderstanding. Look at some graphs in newspapers and see if you think they always do this!

Chapter 26. A good, clear diagram is essential for geometry problems. On it, mark all the facts that are given, but not what you have to prove. This will help you to get an idea of the facts that you will have to use.

Chapter 27. You must keep to the correct order when you perform operations, both in arithmetic and in algebra. The code word BODMAS will help you to remember the order: brackets, 'of', division, multiplication, addition and subtraction.

HISTORY

There is a choice between two syllabuses based on two series of books. It is advisable for a pupil to continue with the series begun in this class as he progresses through the School unless the book chosen has proved unsuitable for him.

The books set for this year are both general in tone and very similar in content, as may be gathered from their titles, but with the later books in the series the two syllabuses differ as follows:

—**Syllabus 1** makes use of the Penguin School History of Britain. As the name suggests, this series deals largely with British History.

—**Syllabus 2** makes use of the Longman Secondary Histories. This series also covers the History of Britain but there is a much stronger emphasis on European and Foreign History than in the Penguin books.

1. OUT OF THE ANCIENT WORLD by Victor Skipp (Penguin, £1.53)

Term 1: Chapters 1-4
Term 2: Chapters 5-8
Term 3: Chapters 9-11

This is the first of the series and the main aim of the year's study should be to arouse and encourage the pupil's interest in the past. The book covers such topics as the discovery of farming, the invention of metallurgy and writing,

the building of the first cities, the evolution of rational thought and scientific method and the growth of democracy, as well as dealing briefly with the ancient civilizations of India and China. The pupil should get some understanding of the extent to which our present civilization in Britain has grown out of the past, i.e. out of the Ancient World.

2. THE ANCIENT WORLD by R. J. Cootes & L. E. Snellgrove (Longman, £1.77)

Term 1: parts 1-4

Term 2: parts 5-7

Term 3: parts 8-9

This book is the first of a series and it aims to interest eleven year olds in a study of the past and to introduce them to some knowledge which forms the basis of later History. It covers such topics as Ancient Western and Eastern civilizations with particular emphasis on the Greeks and Romans. It gives a clear general account of those features of the Ancient World which can be understood by an eleven year old, covering Mesopotamia, Egypt, India, China, the Middle East, Greece and Rome.

Teaching

Whichever series is used, the main facts should be taught to the pupil by the teacher. This means the teacher must become familiar with the information before attempting to teach it and, of course, full use should be made of the pictures, drawings, maps and diagrams in the book. At this age a pupil cannot be expected to read and learn from the book unaided, though preliminary reading of the relevant chapter before the lesson may prove useful.

An exercise book should be kept for the 'Things to do' sections(1) or for general written work and answers to the questions set at the end of the book (2).

Pupils should be encouraged to add their own drawings, plans and written work sparked off by the subject being read about, e.g. extracts from a diary kept by some nobleman in ancient Egypt or Greece.

Where the 'Things to do' sections or the set questions prove impracticable the teacher should make up more suitable questions.

Some time should be devoted to local History if this is at all possible ideally linked to local Geography, e.g. visits to museums, places of interest archaeological sites, remains of former buildings, etc.

GEOGRAPHY

There is a choice between two syllabuses based on two series of books. It is advisable for a pupil to continue with the series begun in this class as he progresses through the School unless the book chosen has proved to be unsuitable.

Syllabus 1 is more suitable for pupils with a particular interest and ability in Geography and aims to give adequate preparation for a G.C.E. course at a later date.

Syllabus 2 is of a more general nature and suitable for pupils of moderate ability in this subject but it also gives a good grounding for later examination work.

The books in both series contain numerous maps, diagrams and pictures and the text is interspersed with relevant questions and exercises.

1. BRITAIN AND OVERSEAS by R. C. Honeybone & M. G. Goss (Heinemann, £1.88)

Term 1: chapters I - IV

Term 2: chapters V - IX

Term 3: chapters X - XVIII

This book is the first of the series and is designed for the first year in a secondary school. It aims to introduce the pupil to some basic geographical skills through studying sample areas of the British Isles and the world in general. The areas have been carefully chosen, covering different parts of the British Isles and with examples from each of the major continents.

The text contains much geographical data in the form of Ordance Survey maps, sketch maps, diagrams, pictures and descriptions (and some statistics) which the pupil has to study in order to answer the questions. The questions vary considerably in difficulty and the teacher may have to select according to the pupil's ability. Some may be answered orally and some written, but in all cases the questions should lead to further discussion.

2. PEOPLE IN BRITAIN by E. W. Young (Arnold, £1.53)

Term 1: chapters 1-3

Term 2: chapters 4-7

Term 3: chapters 8-15

This book is the first of the series and is designed for the first year in the secondary school. A development of the 'sample study' approach is used – actual school-children and their parents have been chosen as representative of certain areas and their various occupations described. This builds up an impression of the life and work in the country as a whole. The book deals solely with the British Isles.

The actual written text has been cut to a minimum and a great deal of data is expressed in the form of maps, diagrams and illustrations. These must be

studied, often with the teacher's help, before the numerous questions can be answered by the pupil.

Supplementary books
(for use with either syllabus)

PHILIPS' VISUAL ATLAS (70p)
FIND THE PLACE IN THE BRITISH ISLES by J. D. Smith (Philip, 53p)
INTERMEDIATE MAP READING by T. Pickles (Dent, 82p)

Atlas work

The Atlas is for general reference and when a region is studied it should be located first on the world map and then on the map of the particular continent or country. If a pupil is taught to use the Atlas properly a great deal can be discovered about a region just by studying the relevant map or maps.

The following points may be helpful:

allowing the pupil time to become familiar with the Atlas so that there is a general impression of how the maps are arranged and therefore how to find what is needed – the world at the front, followed by Europe and the British Isles, Africa in the middle, Australia at the back etc.

teaching the pupil how to locate places by using the index at the back which gives the page number and the latitude and longitude readings.

explaining that each map has a scale, that this is always indicated and that it varies according to what size of map is required for a particular purpose.

drawing attention to the fact that all maps have titles to explain their purpose.

showing the importance of colour – all maps are coloured for a purpose i.e. each colour means something (blue = water, brown = highland etc)

explaining about political and physical maps and the difference between them.

Find the Place in the British Isles will help pupils to become familiar with at least part of the Atlas and should be used regularly throughout the year.

Map Reading

There is no set amount for each term so the book should be used as and when required. If Syllabus 1 is used the pupil will do some map work anyway but if Syllabus 2 is used the map reading book will be needed more often.

The text is self-explanatory and there are plenty of exercises for the pupil to work through.

The book should be studied from the beginning – it would be unsatisfactory to take the topics out of order.

Teaching Geography

At this age pupils must be taught and not left to work through the books unaided. The teacher should read each chapter or section thoroughly and then decide upon the method of instruction e.g. reading with the pupil, telling the pupil, or getting the pupil to read and then discuss, or using a question and answer approach.

Whichever series is used, there are numerous exercises for the pupil to do but, of course, it may not always be practicable or necessary to work through them all.

A file should be kept for the pupil's work and, as well as written work, maps, diagrams and illustrations relevant to the work should be encouraged. The teacher should feel free to set questions other than those given.

Atlas work and map work should be kept separate from the main textbook work. So should any individual project work done by the pupil.

Map work is not meant to be given as much time as the other work so it is not necessary to set aside one lesson each week for it. One lesson every two or three weeks is adequate.

Some time should be devoted to local Geography – especially the study of local Ordnance Survey maps where this is possible. This study can probably be linked with local History. This raises the question of field work in general and for more information on this please see the Teacher's Handbook.

Sketch maps – the ability to draw sketch maps is a technique which pupils should be beginning to acquire. These maps should be large and clear, with a title and neat labelling. Colour should be used, but not overdone, e.g. brown for highland, red dots for towns, blue for rivers etc. However, pupils should not spend hours shading such maps, as this is a waste of time and is not good training.

In general, at this level pupils are collecting facts, acquiring knowledge and learning some basic techniques and skills but they are too young to be expected to apply principles.

SCIENCE

Work from SCIENCE FOR THE 70's BOOK 1 by Mee, Boyd & Ritchie (Heinemann, £2.00) with TEACHER'S BOOK (£2.36)

The book contains more than sufficient work for a year and the teacher can afford to be selective, but at least part of each Unit should be attempted if facilities are available.

Certain experiments are hazardous and should be avoided, or altered in the ways suggested. They are experiments; 1.1 (no lead nitrate or potassium chromate); 1.33, 3.9 (use anhydrous calcium chloride instead of sodium hydroxide pellets); 3.10, 3.32, 4.1, 4.11 (a) 4.24, 4.29, 4.30, 5.20, 5.21 (no chrome alum); 5.30 (no methyl orange or methylene blue); 6.4 (use iodine solution instead of methylene blue); 8.8, 8.10. Also the following items in the Teacher's Guide: page 67 number 8; page 87 number 1; page 88 numbers 4 and 6; page 121 number 10.

As each Unit is completed, the pupil should attempt any practical test given in the Teacher's Guide and also the appropriate objective test from the Appendix.

or work from THE WORLD OF LIFE: THE BIOSPHERE (Murray, 88p)

Pupils should observe the local flora and fauna and keep a nature diary. Overseas members requiring reference books for local use may apply to the Tutor for recommended titles.

FRENCH (optional)

LA LANGUE DES FRANÇAIS by J. R. Watson PREMIER LIVRE (Harrap, £1.88), DEUXIEME LIVRE (£2.24)

Term 1: Premier Livre, lessons 13-15

Term 2: Premier Livre, lessons 16-18

Term 3: Deuxième Livre, lessons 1-3

or A FIRST FRENCH BOOK and A SECOND FRENCH BOOK by W. F. H. Whitmarsh (Longman, £1.00 each)

Term 1: Book 1 lessons 19-26

Term 2: Book 1 lessons 27-34

Term 3: Book 2 lessons 1-8

If a dictionary or further reading matter is required please apply to the School for advice.

LATIN (optional)

THE APPROACH TO LATIN, FIRST PART by J. Paterson & E. Macnaughton (Oliver & Boyd, £1.12)

Term 1: pp. 58-86

Term 2: pp. 87-117

Term 3: pp. 118-144

For reference: The Revised Latin Primer by B. H. Kennedy (Longman, 71p)

PICTURE STUDY

One artist will be studied each term. Reproductions of pictures by the artist for the term are obtainable from the PNEU Office (PNEU, £1.00 each).

For general approach and method of taking lessons see the Picture Study section in the Teacher's Handbook.

ART & DESIGN

Sketching, painting, printing and craftwork using a variety of media should be encouraged.

See the Teacher's Handbook for advice on this subject. If a pupil has developed a special interest in some aspect of Art & Design and needs advice on improving technique please apply to the School for suitable books.

MUSIC

Music Appreciation (optional)

The work of the composer set for the term:

Term 1: Beethoven

Term 2: Handel

Term 3: Schubert

Teacher's reference notes for each composer are available from the PNEU on request.

continued overleaf

A list of records and cassettes, recommended as 'Music for Enjoyment' can be obtained from the PNEU on request.

Singing is always to be encouraged. If song books are required please apply to the School for suitable titles.

Where possible a pupil should learn to play some musical instrument.

PHYSICAL EDUCATION

Daily exercise, dancing, games and swimming.

Better Swimming by N. W. Sarsfield (E.P., 30p)

APPENDICES

1. Educational Materials

3-6 lined exercise books for English
3-6 lined or plain exercise books for Maths
2 squared exercise books (6mm squares) for Maths
2 plain exercise books for Geography

or

12 folders
5 pads of lined paper
5 pads of plain paper
2 pads of squared paper
pad of graph paper
Tags for folders

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Kitchen or sugar paper
2 pads cartridge paper

Pencils – lead and coloured
Felt-tipped pens
Fountain pen preferably with an italic nib
Ink or cartridges
Spare nibs
Ruler – cm and mm
Set squares – 45° and 60°
Protractor
Pair of compasses
Pencil sharpener
Rubber
Poster paints
Water colours
Brushes for above
Gummed coloured squares
Adhesive
Cold water paste (Polycell)
Magnifying glass
Scissors
Paper fasteners
Magnetic compass (pocket type)
Lens (convex or concave)
Bar magnet
Calendar
Electrical equipment e.g. switch, wire, batteries, bulb-holder

Optional

Wire
String
Double punch
Torch
Sellotape
Simple microscope and slides
Measured container (e.g. litre jar)
Musical instrument
Camera

Collect

(for Art & Design)

Coloured pictures from magazines

Oddments of material

Containers and boxes

2. Music for Enjoyment (P.5.)

We shall be pleased to send on request a list of records and cassettes compiled under the following headings:

Quiet, Dignified Music

Lively, Tuneful Music

Descriptive Music

Stories in Music

3. Reference Books

A list of reference books will be sent on request. Though really meant for older children, it will serve to lay the basis of a reference library to be used as the child grows.

4. Charlotte Mason's Educational Principles

The PNEU was founded in 1891 by Charlotte Mason and based its work on principles worked out by her several years earlier when teaching young children. They are still quite valid and, though modern knowledge permits refinements in theory and method, they are set out below as a guide to the PNEU system.

1. Children are born persons.

2. They are not born good or bad, but with possibilities for good or for evil.

3. Authority and obedience are necessary but must be limited by the respect due to the personality of children which must not be encroached upon.

4. We are thus limited to three educational instruments: the atmosphere of environment, the discipline of habit and the presentation of living ideas from which arises the PNEU motto: Education is an atmosphere, a discipline and a life.

5. *Education is an atmosphere* means that a child should not be isolated in a specially adapted "child environment" but we should take into account the educational value of his natural home atmosphere and let him live freely among his proper conditions.

6. *Education is a discipline* means the discipline formed definitely and thoughtfully, of mind or body.

7. *Education is a life* means the need of intellectual, moral and physical sustenance.

8. The child's mind is no mere receptacle as the Herbartian doctrine says but is rather a spiritual *organism* with an appetite for all knowledge.

9. *Education is the science of relations,* i.e. a child has natural relations with a vast number of things and thoughts.

10. A syllabus must therefore include three points:
    (a) A child requires much knowledge, for the mind needs sufficient food as much as the body.
    (b) The knowledge should be various to satisfy curiosity.
    (c) Knowledge should be communicated in well-chosen language because his attention responds naturally to what is conveyed in literary form.

11. The educability of children is normally greater than has hitherto been supposed and is but little dependent upon circumstances such as heredity and environment.

12. There are two guides to moral and intellectual self management to offer children; the way of the will and the way of the reason.

13. Children should be taught as they become mature enough to understand such teaching that the responsibility that rests on them as "persons" is the acceptance or rejection of ideas.

14. No separation between the intellectual and spiritual life of children can be allowed to develop.

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Murray House, Vandon Street, Buckingham Gate, London SW1H 0AJ

THE PNEU SCHOOL

EDUCATIONAL PROGRAMME 87

This Programme is designed for use only with pupils in PNEU Schools and in the Home Education Division. It must not be lent or used for any other purpose.

"Children are born persons" – Charlotte Mason
PNEU Motto: "I am, I can, I ought, I will"

GENERAL NOTES

CONTENTS

This Programme sets out the syllabuses and book lists for the year. The Teacher's Handbook is complementary to it and should be studied before the Programme is put into use.

Essential books are printed in capitals. Other books are optional but would be valuable for supplementary or reference purposes.

The Programme for each form is planned to cover one year's work, divided into 3 terms of 12 weeks each. As enrolments occur throughout the year, new members will normally begin with Term 1 and complete an assessment report on Form R5 before beginning Term 2.

SUPPLIES

Books

An adequate range of books is essential for the PNEU course. The initial books required will be supplied by PNEU tutors and despatched to members overseas by surface mail or, if requested, by air mail. The appropriate postal

and handling charges will be debited. Members going abroad are advised that books should be obtained before departure if possible.

Subsequent requirements of books may be ordered from the PNEU by post on Form R7. 25% of the cost of the books should be added to the payment for postage and handling if sent by surface mail, and 75% if required to be sent by air mail.

Members may find that some books are unobtainable and alternatives will be sent in their stead.

The price given in the Programme is that in force at the time of going to press.

Materials

A list of the educational materials required is set out in Appendix 1. They may be obtained from any firm of educational suppliers. Harrods (Export Department) would be able to supply most of the requirements.

Families going overseas are recommended to obtain these materials before departure.

THE TEACHER'S HANDBOOK

This is a condensed guide to the theory and practice of home teaching which should be used in conjunction with this Programme. Each subject is dealt with in a separate section. It has been kept brief so that even the busy parent can study it.

ASSISTANCE IN TEACHING

The circumstances under which home teaching takes place vary enormously. Parents are advised to seek assistance from friends and colleagues wherever it is appropriate. Not only is a subject or a hobby taught by another person a welcome change but real ability can in this way be harnessed, whether it be mathematical, technical or musical.

THE CURRICULUM

The PNEU course deliberately covers a broad range of subjects. Our aim is to produce soundly educated children who will develop into mature, cultured adults. The PNEU child is marked by a high standard of literacy, mathematical competence, a wide field of knowledge and an enquiring mind.

At this stage a pupil cannot be expected to study the textbooks for himself.

In a school this would not be expected of him except for short periods of private study. The parent must act as a teacher and be ready to spend considerable time on such matters as preparing lessons, answering questions or helping the pupil to find the answer and correcting work the pupil has done.

If at all possible, specialist help should be obtained for Mathematics and work with languages.

THE PNEU JOURNAL

The PNEU Journal is issued quarterly and contains articles of general educational interest as well as information on PNEU.

RECORDS

In the United Kingdom, local education authorities are required to satisfy themselves that the education of all the children in their area is adequate. Parents responsible for home-school pupils must keep a Record of Work and an Attendance Register as they may receive visits from LEA Inspectors or Education Welfare Officers. In some other countries similar conditions may be encountered.

SYLLABUS

RELIGIOUS KNOWLEDGE

Use any edition of the BIBLE. The New English Bible and other modern translations are particularly appropriate.

THE ONE VOLUME BIBLE COMMENTARY by William Neil (Hodder, 95p) is recommended, especially for help with work done on the Old Testament.

Modern translations of the Bible: The New English Bible – illustrated edition (British and Foreign Bible Society, £1.00). The Jerusalem Bible – School Edition (Darton, Longman & Todd, £2.00).

IV — Old Testament

Term 1: II Samuel
Tobit or Jonah

Term 2: I & II Kings
Esther

Term 3: Daniel
Selected Psalms

continued on page 5

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TIME-TABLE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9.00– 9.40	Old Testament	New Testament	Latin or English Language	History	English Language
9.40–10.20	English Language	English Language	History	English Language	Geography
10.20–11.00	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics
11.00–11.20	BREAK				
11.20–12.00	Science	Geography	French or Leisure Reading	French or Private Study	Latin or Leisure Reading
12.00–12.40	Science	Literature	Geography	Literature	Literature
12.40–13.20	French or Science	History	Old Testament	New Testament	History
14.00 – 14.40	Music	Picture Study	Music	Games	P.E.
14.40 – 15.20	Art & Design	P.E.	Nature Study	Science	Private Study
15.20 – 16.00	Art & Design	P.E.	Private Study	Science	Private Study

New Testament

Term 1: St. John chapters 1-7

Term 2: St. John chapters 8-14

Term 3: St. John chapters 15-21

V

Old Testament

Term 1: Isaiah chapters 1-39

Term 2: Isaiah chapters 40-55

Term 3: Isaiah chapters 56-66

New Testament

Term 1: I Corinthians

Term 2: II Corinthians

The Letter of St. James

Term 3: Philippians

Ephesians

St. John's First Letter

ENGLISH

Language

THE ART OF ENGLISH (CERTIFICATE SERIES) by K. Newson (Schofield & Sims, £1.59)

or THE ART OF ENGLISH (GENERAL SERIES) by R. Mansfield (Schofield & Sims, £1.59)

IV BOOK 3 of the chosen series

V BOOK 4 of the chosen series

The Art of English series comprises two complete but closely integrated courses which are designed in such a way that a transfer from one course to the other is possible if this is felt to be in the pupil's interest.

The Certificate Course (C) is suitable for the pupil with imagination and an interest in literature. Throughout the books there are suggestions for further reading and research to develop language skills.

The General Course (G) is very similar but is meant for the pupil who

prefers a practical rather than a literary approach to English.

About six chapters a term should be worked through, whichever book is chosen. There is no need to feel that all the exercises ought to be attempted. Some will be obviously unsuited to those in the home schoolroom and some may be too long for the time available. A selection can be made of those considered most interesting.

For reference: The Concise Oxford Dictionary (Oxford, £4.75).

Literature

Choose one book from each section for each term in drama or fiction or, if drama is omitted, choose two books each term from the fiction section.

Plays

Term 1: ROMEO AND JULIET (Cambridge, 90p)
A MAN FOR ALL SEASONS by Robert Bolt (Heinemann, 50p)

Term 2: ANTHONY AND CLEOPATRA (Cambridge, 90p)
THE COUNTESS CATHLEEN by W. B. Yeats (Penguin, 60p)
THE PLAYBOY OF THE WESTERN WORLD by J. M. Synge (Penguin, 60p)

Term 3: OTHELLO (Cambridge, 90p)
AN INSPECTOR CALLS by J. B. Priestley (Heinemann, 60p)

Poetry

Work throughout the year from one or both of the following:
POEMS FOR PLEASURE BOOK 2 (Cambridge, £1.94)
A CHOICE OF POETS (Harrap, £2.00)

Novels

Term 1: PRIDE AND PREJUDICE by Jane Austen (Penguin, 60p)
JANE EYRE by Charlotte Brontë (Penguin, 75p)
WARRIOR SCARLET by Rosemary Sutcliff (Puffin, 55p)
ANIMAL FARM by George Orwell (Penguin, 50p)
FATHER BROWN STORIES by G. K. Chesterton (Oxford, £2.25)

Term 2: WUTHERING HEIGHTS by Emily Brontë (Penguin, 60p)
GREAT EXPECTATIONS by Charles Dickens (Penguin, 75p)
DAWN WIND by Rosemary Sutcliff (Oxford, £2.50)
CHOCKY by John Wyndham (Penguin, 50p)
KIDNAPPED by Robert Louis Stevenson (Puffin, 30p)

Term 3: TALE OF TWO CITIES by Charles Dickens (Penguin, 75p)
KIM by Rudyard Kipling (Pan Classic, 75p)
THE GOOD COMPANIONS by J. B. Priestley (Penguin, £1.25)
THE FLIGHT OF THE HERON by D. K. Broster (Penguin, 75p)
OF TIME AND STARS by Arthur C. Clarke (Puffin, 50p)

Leisure Reading

The Golden Shadow by L. Garfield & E. Blishen (Carousel, 60p)
Fireweed by Jill Paton Walsh (Puffin, 40p)
Island of the Blue Dolphins by Scott O'Dell (Puffin, 40p)
The Memoirs of Sherlock Holmes by Conan Doyle (Penguin, 60p)
Psmith Journalist by P. G. Wodehouse (Penguin, 50p)
My Family and Other Animals by Gerald Durrell (Penguin, 75p)

MATHEMATICS

IV

NEW GENERAL MATHEMATICS, BOOK 3 by Channon, McLeish Smith & Head (with answers) (Longman, £1.42)

Term 1: chapters 1-9
Term 2: chapters 10-18
Term 3: chapters 19-28

V

NEW GENERAL MATHEMATICS, BOOK 4 by Channon, McLeish Smith & Head (with answers) (Longman, £1.47)

Term 1: chapters 1-11
Term 2: chapters 12-20
Term 3: chapters 21-26

Read the explanations and go through the worked examples in the chapters before doing the exercises even if you think you are familiar with the topic covered.

The following notes point out the common errors and difficulties which can arise.

Book 3

Chapter 1. It is important to set logarithms out correctly as shown on pp. 9-10, keeping the numbers and their logs in separate columns. A number does not "equal" its log, so do not write expressions like 2 = ·3010 when you mean Log 2 = 0·3010 or ·4771 = 3 when you mean antilog 0·4771 = 3.

Points to remember when using logs:

1. Do not resort to logs when ordinary simple methods could be used to give exact answers.
2. Logs cannot be used to add or subtract. Thus to evaluate $x = (4{\cdot}7)^3 - \sqrt{317}$ we must NOT say $\log x = 3 \log 4{\cdot}7 - \frac{1}{2} \log 317$.

The minus in the log statement implies that we are finding $(4{\cdot}7)^3 \div \sqrt{317}$. We cannot translate + or − into logs. All we can do is to find $(4{\cdot}7)^3$ by logs, and then $\sqrt{317}$ by logs, and subtract the latter from the former.

3. Having got your answer, look back at the problem and get a rough check to see if your answer is sensible.

Chapter 2. The basis of this chapter is the theorem that the area of a parallelogram is the product of the base and the perpendicular height. Do not say that it is the product of the two adjacent sides, as you would for a rectangle.

Construction 7 is useful since it enables us to construct other shapes equal in area to the quadrilateral. For example, if we wish to construct a rectangle equal in area to the quadrilateral ABCD, we would first draw the triangle equal in area using this construction and then by drawing a rectangle on the base of the triangle with half its height, we would get the required rectangle.

Notice that the median of the triangle is not the same line as the height of the triangle, nor does it bisect the angle through which it passes. This would only be so if the triangle were isosceles or equilateral.

Chapter 3. Some sets of numbers that form the sides of right angled triangles are: {3, 4, 5}, {5, 12, 13}, {7, 24, 25}, the longest always being opposite the right angle. The results are also true for multiples of these sets. Thus if we know that the two sides of a right angled triangle enclosing the right angle are 15 (= 5 x 3) and 36 (= 12 x 3), then the hypotenuse is 39 (= 13 x 3).

Use of Square Root Tables.

There is an important difference between squares and square roots. If two numbers have the same figures, but their decimal points are in different places, their squares will differ only in the position of their decimal point. But their square roots may differ in the actual figures.

Example $\sqrt{4} = 2$, $\sqrt{40} = 6.325$

Consequently we find that square root tables are arranged in pairs of pages. We must decide what is the first significant figure in the square root, and where the decimal point occurs. Follow this procedure.

In the given number, mark the figures in pairs from the decimal point. Write above the left-hand pair of figures (or figure, if there is a single figure left over when you have done the pairing) the largest number whose square is not greater than the number formed by this left-hand pair, and put a cross over each of the remaining pairs of figures. The decimal point in the square root goes above that in the original number. Now find the page on which the square root starts with the number you have written.

Example. Find the square root of

1. 74860 2. 748600 3. 0·0007486 4. 0·00007486

1. 2 | – | – .
   7 | 4 8 | 6 0. Rough estimate 200

Find the page on which the square root starts with 2

$\sqrt{}$ 74860 = 273·6

2. 8 | – | – .
   7 4 | 8 6 | 0 0. Rough estimate 800

Find the page on which the square root starts with 8.

$\sqrt{}$ 748600 = 865·2

3. 0·0 | 2 | – | –
   0·0 0 | 0 7 | 4 8 | 6 Rough estimate 0·02

Find the page on which the square root starts with 2.

$\sqrt{}$ 0·0007486 = 0·02736

4. 0·0 | 0 | 8 | –
   0·0 0 | 0 0 | 7 4 | 8 6 Rough estimate 0·008

Find the page on which the square root starts with 8

$\sqrt{}$ 0·00007486 = 0·008652

You may find that some books of tables (e.g. Cambridge Elementary tables) combine the pair of pages into two entries for each number on the same page. In this case by the same method you must decide which entry for 7486 you must choose instead of deciding which page to look for.

Chapter 5. For the revision examples you will need the definition of ratio as the comparison of two quantities of the SAME kind, the comparison being made by stating what fraction one is of the other. Thus if a:b = 3:4 then this is equivalent to $\frac{a}{b} = \frac{3}{4}$ or $a = \frac{3}{4}b$.

Proportion is the quality of ratios. If four quantities are such that $\frac{a}{b} = \frac{c}{d}$ they are in proportion.

Rate connects two quantities of DIFFERENT kinds.

Chapter 8. A flow chart is a diagram that describes how a particular calculation is broken into its separate stages before detailed shorthand instructions are written for the computer. The individual instructions are joined by arrowed lines which indicate the order in which the diagram is to be used. Because of its possible complexity the flow chart MUST have a 'start' point and a definite 'stop' and these are entered in oval boxes.

Each instruction is put in a rectangular box. If the flow chart contains a question from which a decision must be made, it is put in a diamond shaped box. A decision box can only contain a question that can be answered by 'yes' or 'no'. You cannot ask the question 'Is x four or five?' Each decision box has two exits 'yes' or 'no', one of these will return by a loop to a previous point in the flow chart and so repeat a given process, the other exit will have the effect of carrying on to a new process or end the program.

Once you have written your flow chart, work through the instructions exactly as you have written them to see if you do get the process you wanted to achieve.

There are many different computer 'languages' where a particular word is a code word for an instruction. 'Read' on page 108 is the code word for 'give a, b, c the required values'.

Chapter 9. With the advent of cheap electronic calculators it may well be that the days of the slide rule are numbered. However it is worth acquiring proficiency in its use as it is a help in calculations where a limited degree of accuracy is permitted.

Chapter 10. The examples in this chapter can be done without slide rules as good mathematical tables should contain Secant and Cotangent tables. Remember that any trigonometric ratio can only be applied to a right angled triangle, so if your diagram of the problem does not contain 90^o then you must add a construction to your diagram so that it does.

Chapter 12. Avoid the method of detached coefficients: it is very easy to make mistakes with it.

You must be able to quote these results:

1. $a^2 + b^2$ has no factors.
2. $a^2 - b^2 = (a - b)(a + b)$
3. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
4. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

When you are looking for factors in an expression first look to see if there is a common numerical factor to take out. Then count up the number of terms there are.

1. If there are only two terms it could be of types 1 – 4.

2. If there are three terms it should factorise into two brackets.
3. If there are four or more terms you will have to group the terms before you can factorise.

Chapter 13. LCM and HCF are found in algebra in the same way as they are found in arithmetic. Basically in arithmetic, firstly we factorise the numbers, then the HCF is the highest factor that the numbers have in common, and the LCM is the smallest number they will all go into.

Example. $48 = 2^4 \times 3$, $24 = 2^3 \times 3$, $18 = 2 \times 3^3$

$\text{HCF} = 2 \times 3 = 6$

$\text{LCM} = 2^4 \times 3^2 = 144$

Similarly in algebra each expression must be factorised first and the required factors picked out.

When fractions are simplified, only complete factors of the numerator and denominator can be cancelled.

For example you must not say

$$\frac{a^3 - b^3}{a - b} = \frac{a^2 \cancel{a^3} - \cancel{b^3} b^2}{\cancel{a - b}} = a^2 - b^2$$

Factorise first:

$$\frac{a^3 - b^3}{a - b} = \frac{\cancel{(a - b)}(a^2 + ab + b^2)}{\cancel{(a - b)}} = a^2 + ab + b^2$$

When solving equations watch out for minus signs which change the signs inside the brackets when these are removed as in Ex. 13f 1–10.

Chapter 14. The problems in this chapter are based on these three basic facts:

1. If you require a point to be a distance r from a point A it must lie on a circle centre A and radius r.
2. If you require a point to be equidistant from two fixed points A and B it must lie on the perpendicular bisector of AB.
3. If you require a point to be equidistant from two given lines which cross at A it must lie on the bisectors of the angles through A.

All the constructions of Ex. 14b are combinations of these three constructions.

Chapter 16. When you have to change the subject of a formula follow these rules in the correct order.

1. Remove fractions.
2. Remove brackets.
3. Isolate terms containing the subject.
4. Obtain the subject.

If your subject is inside a square root, this root must be isolated BEFORE squaring to remove the root.

Chapter 17. In 'O' Level examinations you are not often asked to prove a basic theorem in geometry, but when you are it is usually one of the circle theorems. Therefore you must learn the proofs of these.

Chapter 18. The rules for combining surds are:

1. $\sqrt{m} \times \sqrt{n} = \sqrt{mn}$
2. $a\sqrt{m} = \sqrt{a^2 m}$
3. $\dfrac{\sqrt{m}}{\sqrt{n}} = \sqrt{\dfrac{m}{n}}$

It is incorrect to say $\sqrt{m} + \sqrt{n} = \sqrt{m + n}$

To simplify surds you are meant to use these rules and not square root tables.

Chapter 20. Notice the fundamental difference between

$\text{Log}\dfrac{M}{N} = \text{Log } M - \text{Log } N$ and $\dfrac{\text{Log } M.}{\text{Log } N}$ They are not the same expression.

Example. $\text{Log}\dfrac{3}{2} = \text{Log } 3 - \text{Log } 2 = 0{\cdot}4771 - 0{\cdot}3010 = 0{\cdot}1761$

$$\frac{\text{Log } 3}{\text{Log } 2} = \frac{0{\cdot}4771}{0{\cdot}3010} = 1{\cdot}59$$

Chapter 21. Inequalities behave like equations except in one important way. An equation can be multiplied by any number positive OR negative without altering its basic result.

Example. if $x + 4 = 6$ then $2(x + 4) = 12$ and
$-3(x + 4) = -18$ are both true.

But you cannot multiply an inequality by a minus number.

Example. $3 < 8$ is true

and $3 \times 5 < 8 \times 5$ is true

but $3 \times -5 < 8 \times -5$ or $-15 < -40$ is NOT true.

So if we have the inequality $-22 < -3$ then we must not say

$x < \dfrac{-3}{-2}$ or $x < \dfrac{3}{2}$. We must say

$-2x < -3$ $\qquad$ $0 < 2x - 3$, $\quad 3 < 2x$, $\quad \dfrac{3}{2} < x$

Chapter 28. The basic transformations and their matrices are summarised in the following table:

Transformation	Matrix
Identity	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
Rotation about (0, 0) through 90°	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$
Rotation about (0, 0) through 180°	$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$
Rotation about (0, 0) through 270°	$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$
Reflection in the line $x = 0$	$\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$
Reflection in the line $y = 0$	$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$
Reflection in the line $x = y$	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

continued overleaf

Reflection in the line $x + y = 0$	$\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$
Enlargement centre (0, 0), scale factor K	$\begin{pmatrix} K & 0 \\ 0 & K \end{pmatrix}$
Shear invariant line y = 0, (0,1) (K,1)	$\begin{pmatrix} 1 & K \\ 0 & 1 \end{pmatrix}$
Shear invariant line $x = 0$, (1,0) (1,K)	$\begin{pmatrix} 1 & 0 \\ K & 1 \end{pmatrix}$

Book 4

Book 4 is a book of revision on the basic course, and work on a wide range of selected topics in 'modern' and 'traditional' mathematics. Not many of these topics will occur in any single syllabus of a particular G.C.E. Board. Therefore you must check through the syllabus of the examination you wish to take and decide which of these topics you will need.

Chapter 2. The essential fact to be understood is that the nominal value of the share is the amount written on the certificate of the share. It is on this nominal value that the interest is calculated. The CASH value of the certificate is the price the share will bring in the stock market, and this may differ greatly from the nominal value.

Chapter 3. The basic procedure when solving two equations only one of which is linear is as follows:

1. Decide which is the linear equation ($xy = 2$ or $x + \frac{2}{y} = 1$ are NOT linear).
2. Make the x or the y the subject of this linear equation.
3. Substitute this expression into the second equation to form a quadratic and solve it.

Chapter 4. Inequalities with unknowns in the denominator are best treated by putting the expression on a common denominator.

Example 1. Find the range of x for which $\frac{6}{x} > 3$

Solution $\frac{6}{x} - 3 > 0, \quad \frac{6 - 3x}{x} > 0$

Numerator and denominator must BOTH be positive, or numerator and denominator must BOTH be negative for this to be true

$$0 < x < 2$$

Example 2. Find the range of x for which $\frac{6}{x} < 2$

Solution $\frac{6}{x} - 2 < 0, \quad \frac{6 - 2x}{x} < 0$

Numerator and denominator must be of DIFFERENT signs, $\frac{+}{-}$ or $\frac{-}{+}$

for this to be true $x > 3$ or $x < 0$

Chapter 5. It is important to set the working out correctly. A trigonometric function and its angle are different things. They cannot be "equal", so do not write $\text{Cos}\,\theta = \cdot 7071 = 45^\circ$. You must say $\text{Cos}\,\theta = \cdot 7071, \theta = 45^\circ$.

Chapter 8. There are six parts to every triangle – 3 sides and 3 angles. If we are given any three of these parts (provided one at least is a side) we can find the others. We

cannot tell the size of a triangle when only its three angles are given, for in that case there can be an infinite number of triangles.

We use the sine formula when we are given:

1. one side and two angles.
2. two sides and an angle that is not included between the given sides.

Draw a good diagram for your triangle, taking care so that the biggest side is opposite the biggest angle. If an angle is obtuse make it look so. You can use the diagram to check if the answers you get are sensible.

There may be times in cases of (2) when two different solutions are possible. Your diagram will show you this.

Chapter 9. We use the cosine rule to solve a triangle when we are given:

1. two sides and an included angle
2. three sides

The commonest error in using this formula is to combine the terms incorrectly. In Example 1 on page 65 it would be incorrect to say:

$$x^2 = 4 + 9 - 12 \text{ Cos } 80^\circ = 1 \text{ Cos } 80^\circ.$$

There are no brackets implied in the cosine rule. 12 Cos 80° must be worked out first, and then subtracted from 13.

Chapter 10. Given four quantities in proportion, it is possible to deduce other proportions involving the same quantities which can be useful in solving problems.

If $\frac{a}{b} = \frac{c}{d}$ then we also know that

1. $\frac{b}{a} = \frac{d}{c}$ 2. $\frac{a}{c} = \frac{b}{d}$ 3. $\frac{a + b}{b} = \frac{c + d}{d}$

4. $\frac{a - b}{b} = \frac{c - d}{d}$ 5. $\frac{a - b}{a + b} = \frac{c - d}{c + d}$ 6. $\frac{a}{b} = \frac{a + c}{b + d}$

Chapter 11. There is a distinction between equiangular and similar. Figures are only similar when, in addition to having corresponding angles equal, their corresponding sides are proportional. All equiangular triangles are similar, but this may not be so in other figures. For example, a rectangle whose dimensions are 12cm by 5cm is equiangular to one that is 13cm by 7cm, but they are not similar figures.

Similar triangles are obtained in three ways, by having:

1. two angles of one = two angles of the other
2. three sides of one proportional to three sides of the other
3. one angle equal and containing proportional sides

Notice in theorem 19 it would NOT be true to say that

AX : XB = XY : BC

Chapter 13. Once you have drawn your triangle of velocities the problem becomes one of solving a triangle in trigonometry. Therefore decide whether you have a case that needs the sine or cosine rule for its solution, or if it is a simple case with a right angle.

The questions in this chapter have all been solved by means of a scale drawing and then checked by calculation.

If a question specifies "find", you can obtain a solution by either drawing OR calculation.

If a question specifies "calculate" then you must obtain a solution by calculation, a scale drawing would not be acceptable as accurate enough.

Chapter 14. The most difficult part of probability questions is to decide whether two

probabilities have to be added or subtracted. Follow these rules:

Addition rule: If events A and B are mutually exclusive (i.e. cannot happen together) then the probability of A or B happening is

$$P(A \text{ or } B) = P(A) + P(B)$$

Example. On drawing a playing card from a pack

$$P(\text{ace}) = \frac{1}{13} \quad \text{and} \quad P(\text{king}) = \frac{1}{13}$$

$$\therefore \text{probability of an ace OR king} = \frac{1}{13} + \frac{1}{13} = \frac{2}{13}$$

Notice here only ONE event takes place. We choose an ace OR a king.

Multiplication rule: If events C and D are independent (do not affect each other) then the probability of both C AND D happening is P (C and D) = P(C) x P(D).

Example. The probability of obtaining a head from tossing a coin is ½. The probability of obtaining a six from a dice is $\frac{1}{6}$.

If they are spun together, the probability of obtaining a head AND a six is P (head and six) = $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$.

Notice here TWO events take place. We get a head AND a six.

HISTORY

There is a choice between two syllabuses based on two series of books. The two syllabuses differ as follows:

– Syllabus 1 makes use of the Penguin School History of Britain. As the name suggests, this series deals largely with British History.

– Syllabus 2 makes use of the Longman Secondary Histories. This series also covers the History of Britain but there is a much stronger emphasis on European and foreign History than in the Penguin books.

1. THE MAKING OF A NATION by A. J. Patrick (Penguin, £1.53)
   BRITAIN AND THE WORLD 1789-1901 by A. M. Newth (Penguin, £1.53)
   BRITAIN IN THE MODERN WORLD: THE TWENTIETH CENTURY by Nash & Newth (Penguin, £1.65)

These three books are the third, fourth and fifth books of the series and cover the development of Britain from the beginning of Stuart times to the mid 1960's. While dealing with political History there is also quite a strong emphasis on social and economic History.

In all three books, the chapters deal with various topics and are divided into convenient sub-sections. At the end of each chapter there are dates to remember, things to do and discuss and further books to read.

2. THE EARLY MODERN AGE by L. E. Snellgrove (Longman, £1.94)
   BRITAIN SINCE 1700 by R. J. Cootes (Longman, £2.06)
   THE MODERN WORLD SINCE 1870 by L. E. Snellgrove (Longman, £2.06)

These books are the third, fourth and fifth of the series and cover the development of Britain, Europe and European colonial expansion from the Fifteenth Century. There are also chapters dealing with social and economic changes and, in the last book, quite a lot of emphasis on the two world wars and their effects on the world today.

All the books are in chapters, further divided into sections. The Early Modern Age has questions at the end of each chapter and the other two books have ideas for further study. All three have suggestions for books recommended for further reading.

Teaching

Generally speaking, most pupils will need to be taught by a teacher who has studied the material in the books first. The maximum use should be made of drawings, pictures and diagrams in the text book. It may sometimes be necessary to leave a pupil to work unaided from the book, i.e. to read, make notes, or possibly to answer questions. If this is done the work should be checked carefully and gone over with the pupil. At 13 and 14 children are still too young to be able to teach themselves; it is quite unreasonable to expect them to do so.

A file, or exercise book, should be kept for the 'Things to do' sections, written work, questions etc. Of course sometimes answering the questions in the books may not be possible because of limitations imposed by environment. Also the teacher should give additional questions, e.g. essays, which can be answered from the text. If pupils are interested in drawing pictures and plans etc. then this should be encouraged but it is not essential, especially in Year 10 where the emphasis should be on written work.

There should be as much discussion as possible on topics covered and on related subjects.

Recommended books may be helpful but there should be plenty to do without these, if they are unobtainable.

There is no set amount of work for each term as this will vary from pupil to pupil. Three books are recommended in each series but many pupils will only cover two, or less, in the two years.

Some time should be devoted to local History if this is at all possible – ideally linked to local Geography, e.g. visits to museums, churches, places of interest, archaeological sites, remains of former buildings, etc.

GEOGRAPHY

There is a choice between two syllabuses based on two series of books.

– Syllabus 1 is more suitable for pupils with a particular interest and ability in Geography and aims to give adequate preparation for a G.C.E. course at a later date.

– Syllabus 2 is of a more general nature and suitable for pupils of moderate ability in this subject but it also gives a good grounding for later examination work.

The books in both series contain numerous maps, diagrams and pictures and the text is interspersed with relevant questions and exercises.

1. NORTH AMERICA AND ASIA by Honeybone & Graves (Heinemann, £2.60)

This book is the third in the series and covers the regional Geography of North America, U.S.S.R. and Asia. It includes some detailed studies of Ordnance Survey maps and introduces aspects of physical, economic and mathematical Geography. Apart from the text, pupils have to study data in the form of O.S. maps, sketch maps, diagrams, pictures, descriptions and statistics in order to answer the numerous questions. These vary a lot in the degree of difficulty and it may be necessary to select according to the ability of the pupils. Some questions may be answered orally rather than written but all should lead to further discussion.

2. REGIONS OF THE WORLD: THEIR WORK AND WEALTH by J.H. Lowry (Arnold, £1.65)

   THE BRITISH ISLES: PHYSICAL AND REGIONAL by J.H. Lowry (Arnold, £1.59)

These books are the third and fourth of the series. Regions of the World (Book 3) deals to quite a large extent with economic Geography, treated under the headings of major world products – agricultural and mineral. Book 4 is a detailed study of the British Isles.

In both books, actual written text has been cut to a minimum and a great deal of data is expressed in the form of maps, diagrams, illustrations and statistics. These must be studied by the pupil, with or without the teacher's help (depending on the ability of the pupil) before the numerous questions can be answered. The books are designed, by their method of approach, to lead to genuine geographical understanding and interest, rather than just memorisation of facts.

PHILIPS' MODERN SCHOOL ATLAS (£1.75)

MAP READING & LOCAL STUDIES IN COLOUR by Fullagar & Virgo (Hodder, £1.45).

A GROUNDWORK OF PHYSICAL GEOGRAPHY by Jackson & Penn (Philip, £1.59).

Atlas

This is for general reference and it should be remembered that pupils can learn a great deal from studying the various maps in an atlas. Each region that is being studied should be located in the atlas before study begins. It is presumed that by this stage pupils know how to use an atlas and understand something of the techniques involved in making the atlas maps (e.g. scale, title, colour, latitude, longitude). If not, sometime should be devoted to this and to allowing the pupil to become familiar with his or her own atlas.

Map Reading and Local Studies in Colour

Map reading is an essential part of Geography so, as the pupils get older, more time should be spent on this aspect of Geography. The set book is excellent and the text self-explanatory. There are numerous photographs, diagrams and exercises. Exercises are divided into:

A – more suitable for the less academic (C.S.E.)

B – more suitable for the more academic (G.C.E.)

While a certain amount of written work should be done, sometimes exercises can be completed orally if they are suitable.

Teaching Geography

Generally speaking at this age pupils still need to be taught by a teacher who has studied the relevant material first. They are still too young to be left to teach themselves from the books. There may be occasions when they can be left to do exercises etc. but there should also be discussion of the topic involved, preferably beforehand and certainly afterwards. A file should be kept for written work and in Geography maps and diagrams form an essential part of this work.

By the end of Year 10 pupils should be able to draw sketch maps with ease (large, clear, labelled with a minimum amount of colour – brown for highland, blue for rivers, red dots for towns etc.) – they should not spend hours shading maps; this is a waste of time and effort.

The file should be divided into sections and regional, physical and map work should not be mixed up. The teacher may wish to set questions other than those in the textbook and this is, of course, satisfactory.

It will be noted that there is no indication given of how much should be studied each term. This is because it will vary greatly according to the ability of the child. As a rough guide of the 2 hours spent on Geography each week, about 1-1½ hours should be spent on regional and about ½-1 hour on either map work or physical Geography. Therefore in each year about

half the map reading, physical Geography and Syllabus 1 books should be completed, and, if the Syllabus 2 books are used, one a year will be completed – but this will be variable.

Some time should be devoted to local Geography – especially the study of local O.S. maps where this is possible. This topic can probably be linked with local History. This raises the question of field work in general and, for more information on this, see the Teacher's Handbook.

At this age pupils are to a very large extent still acquiring knowledge while learning basic techniques and skills though they should, of course, be encouraged to question material and to think for themselves.

SCIENCE

Work from:

IV PATTERNS IN THE LIVING WORLD (Murray, £1.12)

V LOOKING INTO ORGANISMS (Murray, £1.27)

Pupils should observe the local flora and fauna and keep a nature diary. Overseas members requiring reference books for local use may apply to the Tutor for recommended titles.

FRENCH (optional)

IV

LA LANGUE DES FRANÇAIS by J.R. Watson, DEUXIÈME LIVRE (Harrap, £2.24) and TROISIÈME LIVRE (Harrap, £2.36)

Term 1: Deuxième Livre, lessons 13-15
Term 2: Troisième Livre, lessons 1-3
Term 3: Troisième Livre, lessons 4-6

or A THIRD FRENCH BOOK by W.F.H. Whitmarsh (Longman, £1.06)

Term 1: lessons 1-9
Term 2: lessons 10-18
Term 3: lessons 19-28

V

LA LANGUE DES FRANÇAIS, TROISIÈME LIVRE by J.R. Watson (Harrap, £2.36)

Term 1: lessons 7-9
Term 2: lessons 10-13
Term 3: lessons 14-16

or A FOURTH FRENCH BOOK by W.F.H. Whitmarsh (Longman, £1.06)

Term 1: lessons 1-7
Term 2: lessons 8-15
Term 3: lessons 16-22

If a dictionary or further reading matter is required please apply to the School for advice.

LATIN (optional)

THE APPROACH TO LATIN, PART 2 by J. Paterson & E. Macnaughton (Oliver & Boyd, £1.18)

IV Term 1: pp. 1-32
Term 2: pp. 33-60
Term 3: pp. 61-88

V Term 1: pp. 89-114
Term 2: pp. 115-139
Term 3: pp. 140-161

For reference: The Revised Latin Primer by B.H. Kennedy (Longman, 71p).

ART STUDIES

Picture Study

One artist will be studied each term. Reproductions of pictures by the artist for the term are obtainable from the PNEU Office (PNEU, £1.00 each).

For general approach and method of taking lessons see the Picture Study section in the Teacher's Handbook.

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History of Art & Architecture

IV

AN INTRODUCTION TO GREAT ARTISTS by M. Forrester (Blandford, £1.00)

Term 1: chapters 1-5
Term 2: chapters 6-10
Term 3: chapters 11-15

V

A HISTORY OF ARCHITECTURE IN ENGLAND by T.W. West (U.L.P., 90p)

Term 1: chapters 1-3
Term 2: chapters 4-6
Term 3: chapters 7-9

Art & Design

Sketching, painting, printing and craftwork, using a variety of media should be encouraged. See the Teacher's Handbook for advice on this subject. If a pupil has developed a special interest in some aspect of Art and Design and needs advice on improving technique please apply to the School for suitable books.

MUSIC

Music Appreciation (optional)

The work of the composer set for the term:

Term 1: Beethoven
Term 2: Handel
Term 3: Schubert

Teacher's reference notes for each composer are available from the PNEU on request.

A list of records and cassettes, recommended as 'Music for Enjoyment' can be obtained from the PNEU on request.

Singing is always to be encouraged. If song books are required please apply to the School for suitable titles.

Where possible a pupil should learn to play some musical instrument.

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PHYSICAL EDUCATION

Daily exercise, dancing, games and swimming.

Better Swimming by N. W. Sarsfield (E.P., 30p)

APPENDICES

1. Educational Materials

3-6 lined exercise books for English
3-6 lined or plain exercise books for Maths
2 squared exercise books for Maths (6mm squares)
2 plain exercise books for Geography

or

12 folders
5 pads of lined paper
5 pads of plain paper
2 pads of squared paper
pad of graph paper
Tags for folders

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Kitchen or sugar paper
2 pads cartridge paper
Pencils – lead and coloured
Felt-tipped pens
Fountain pen – preferably with an italic nib
Ink or cartridges
Spare nibs
Ruler – cm and mm
Set squares – 45° and 60°
Protractor
Pair of compasses
Slide rule

continued overleaf

Pencil sharpener
Rubber
Poster paints
Water colours
Brushes for above
Adhesive
Cold water paste (Polycell)
Magnifying glass
Scissors
Paper fasterners
Magnetic compass (pocket type)
Calendar

Optional

Double punch
String
Torch
Sellotape
Simple microscope and slides
Measured container (e.g. litre jar)
Musical instrument
Camera

2. Music for Enjoyment (P.S.)

We shall be pleased to send on request a list of records and cassettes compiled under the following headings:

Quiet, Dignified Music
Lively, Tuneful Music
Descriptive Music
Stories in Music

3. Reference Books

A list of reference books will be sent on request. This will serve to lay the basis of a reference library to be used as the child grows.

4. Charlotte Mason's Educational Principles

The PNEU was founded in 1891 by Charlotte Mason and based its work on principles worked out by her several years earlier when teaching young children. They are still quite valid and, though modern knowledge permits refinements in theory and method, they are set out below as a guide to the PNEU system.

1. Children are born persons.

2. They are not born good or bad, but with possibilities for good or for evil.

3. Authority and obedience are necessary but must be limited by the respect due to the personality of children which must not be encroached upon.

4. We are thus limited to three educational instruments: the atmosphere of environment, the discipline of habit and the presentation of living ideas from which arises the PNEU motto: Education is an atmosphere, a discipline and a life.

5. *Education is an atmosphere* means that a child should not be isolated in a specially adapted "child environment" but we should take into account the educational value of his natural home atmosphere and let him live freely among his proper conditions.

6. *Education is a discipline* means the discipline formed definitely and thoughtfully, of mind or body.

7. *Education is a life* means the need of intellectual, moral and physical sustenance.

8. The child's mind is no mere receptacle as the Herbartian doctrine says but is rather a spiritual *organism* with an appetite for all knowledge.

9. *Education is the science of relations,* i.e. a child has natural relations with a vast number of things and thoughts.

10. A syllabus must therefore include three points:
    (a) A child requires much knowledge, for the mind needs sufficient food as much as the body.
    (b) The knowledge should be various to satisfy curiosity.
    (c) Knowledge should be communicated in well-chosen language because his attention responds naturally to what is conveyed in literary form.

continued overleaf

11. The educability of children is normally greater than has hitherto been supposed and is but little dependent upon circumstances such as heredity and environment.

12. There are two guides to moral and intellectual self management to offer children; the way of the will and the way of the reason.

13. Children should be taught as they become mature enough to understand such teaching that the responsibility that rests on them as "persons" is the acceptance or rejection of ideas.

14. No separation between the intellectual and spiritual life of children can be allowed to develop.

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